

Claims:

1. An earth working scraper comprising:
 - a scraper blade for scraping earth from a ground surface;
 - a receiving area located near the blade for receiving earth scraped from the ground surface by the blade;
 - a rotatable axle for providing movement of the scraper to allow the blade to scrape the earth, the axle connected with respect to the blade and receiving area; and
 - a track apparatus connected with respect to the rotatable axle, the track apparatus including:
 - a continuous flexible track having an upper length and a ground-engaging lower length and including an inner surface;
 - an axle wheel mountable to the rotatable axle for rotational movement therewith, the axle wheel engaging the inner surface of the flexible track along the upper length to drive the flexible track in response to rotation of the axle; and
 - a frame for mounting the axle wheel.
- 20 2. The scraper of claim 1 further comprising a first end adapted for attachment to a prime mover and a second end including the rotatable axle.
3. The scraper of claim 2 further comprising two track apparatus positioned at the second end and axially aligned.
- 25 4. The scraper of claim 2 wherein the scraper is a pull-type scraper such that it is towed by the prime mover and the rotatable axle of the scraper is not powered.
5. The scraper of claim 2 wherein the scraper is connected to the prime mover by a hitch.

6. The scraper of claim 2 wherein the rotatable axle is powered.
 7. The scraper of claim 1 wherein the receiving area is an interior bin, the interior bin being located adjacent to the scraper blade.
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 8. The scraper of claim 1 comprising a tractor section and a scraper section, the scraper section including the blade, receiving area, axle and track apparatus, the tractor section including a pair of ground-engaging wheels.
- 10 9. The scraper of claim 8 wherein the ground-engaging wheels are powered.
10. The scraper of claim 8 wherein the rotatable axle is powered.
11. The scraper of claim 1 further comprising a first end adapted for
15 attachment to a second scraper and a second end including the rotatable axle, the second scraper being independently powered or towed by a prime mover.

12. The scraper of claim 1 wherein the track apparatus further includes a plurality of wheels engaging the inner surface of the track, including leading and trailing idler wheels, and at least one bogie wheel engaging only a middle portion of the
5 lower length of the track, and wherein:

- the frame is of a uni-body construction such that it includes fixed-mounts in fixed relative positions, each fixed-mount defining an axis;
- the axle wheel is rotatably mounted to one of the fixed-mounts and turns on the respective fixed-mount axis;
- 10 · one of the idler wheels is rotatably mounted to one of the fixed-mounts and turns on the respective fixed-mount axis,
- the at least one bogie wheel is rotatably mounted to one of the fixed-mounts and turns on the respective fixed-mount axis, and
- an idler-mounting bracket is pivotably mounted to another of the fixed-
15 mounts and pivots on the respective fixed-mount axis, the bracket having an idler-mount defining an idler-mount axis at which the other idler wheel is rotatably mounted in variable positions with respect to the frame.

13. The scraper of claim 12 wherein the frame defines a lateral recess receiving
20 the axle wheel.

14. The scraper of claim 12 wherein the frame includes a spindle hub for rotatably receiving the rotatable axle.

25 15. The scraper of claim 12 wherein the fixed-mounts comprise apertures for receiving axles therethrough.

16. The scraper of claim 12 wherein the trailing idler wheel is rotatably mounted to one of the fixed-mounts and the leading idler wheel is rotatably mounted
30 to the idler-mount.

17. The scraper of claim 12 wherein the trailing idler wheel comprises a pair of axially-aligned wheels and the leading idler wheel comprises a pair of axially-aligned wheels.

5 18. The scraper of claim 12 wherein the track apparatus further comprises a leading idler assembly attached to the frame at one of the fixed mounts, the leading idler assembly including the leading idler wheel engaging the flexible track.

10 19. The scraper of claim 1 wherein the track apparatus further comprises:

- an idler assembly having an idler wheel engaging the track, the idler assembly being moveable with respect to the frame;
- tensioning device for maintaining tension on the continuous flexible track, the tensioning device comprising:
 - a main-cylinder housing interconnected to one of the frame and the idler assembly, the housing extending along an axis and defining a main chamber therein;
 - a main piston having a first end operatively connected to the other of the frame and the idler assembly and a second end slidably received within the chamber, the piston movable between a retracted position and an extended position;
 - a primary dampening structure for resisting movement of the piston toward the retracted position for a first predetermined axial length; and
 - a secondary dampening structure for resisting movement of the piston toward the retracted position for a further axial length beyond the first predetermined axial length, the secondary dampening structure resisting movement of the piston independent of the primary dampening structure.

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20. The scraper of claim 19 wherein the primary dampening structure includes:
- a primary cylinder extending along an axis and defining a primary chamber therein; and
 - a primary piston slidably received in the primary cylinder and movable axially between a first and second position, the primary piston dividing the primary chamber into a first portion for receiving a pressurized gas and a second portion.
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- 10 21. The scraper of claim 20 wherein the secondary dampening structure includes:
- a secondary cylinder extending along an axis and defining a secondary chamber therein; and
 - a secondary piston slidably received in the secondary cylinder and movable axially between a first and second position, the secondary piston dividing the secondary chamber into a first portion for receiving a pressurized gas and a second portion; whereby the conduit interconnects the main chamber and the second portion of the secondary chamber and wherein the hydraulic fluid is disposed within the second portion of the secondary chamber.
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- 20 22. The scraper of claim 21 wherein the pressure of the pressurized gas in the first portion of the secondary chamber is greater than the pressure of the pressurized gas in the first portion of the primary chamber.
- 25 23. The scraper of claim 22 wherein the primary and secondary dampening structures operate to progressively increase resistance to movement of the idler wheel toward the deflected position as the idler wheel moves toward the deflected position.
- 30 24. The scraper of claim 19 wherein the dampening structures are mounted at a position remote from the housing and piston.

25. The scraper of claim 1 wherein the flexible track includes spaced lugs projecting from the inner surface, each lug terminating in a distal surface spaced inwardly from the main inner surface, and wherein the axle wheel comprises:

- 5 · a central hub portion mountable on the axle for rotational movement therewith;
- a radially-extending portion terminating in a circumferential edge; and
- a peripheral portion affixed to the circumferential edge and having outwardly-facing lug-engagement surfaces positioned for engagement with the distal surfaces of the track lugs.

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26. The scraper of claim 25 wherein the peripheral portion includes an outer rim forming the outwardly-facing lug-engaging surfaces.

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27. The scraper of claim 26 wherein the outer rim includes a plurality of spaced openings therein.

28. The scraper of claim 25 wherein the peripheral portion includes peripherally-spaced cross-members affixed to the circumferential edge and forming the outwardly-facing lug-engaging surfaces.

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29. The scraper of claim 25 wherein the axle wheel is substantially free of side structure in positions laterally adjacent to the lug-engagement surfaces and radially beyond the circumferential edge, whereby the track lugs are free to adjust their precise positions of engagement with the lug-engagement surfaces.

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30. The scraper of claim 25 wherein the outwardly-facing lug-engagement surfaces are substantially planar.

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31. The scraper of claim 25 wherein:

- the peripheral portion affixed to the circumferential edge has radially-projecting drive members defining lug-receiving gaps therebetween,
- the outwardly-facing lug-engagement surfaces are within the lug-receiving gaps in position for engagement with the distal surfaces of the track lugs, and
- the axle wheel is substantially free of side structure in positions which are laterally adjacent to the lug-engagement surfaces between adjacent pairs of the drive members and radially beyond the circumferential edge, whereby the track lugs are free to adjust their precise positions of engagement with the lug-engagement surfaces.

32. The scraper of claim 25 wherein the peripheral portion includes a plurality of spaced openings for allowing debris to pass through the peripheral portion.

33. The scraper of claim 25 wherein the outwardly-facing lug-engagement surfaces are substantially convex.

34. The scraper of claim 33 wherein each lug-engagement surface extends in an axial direction parallel to the drive axis such that each lug-engagement surface is a portion of a cylinder.

35. The scraper of claim 33 wherein the axle wheel is substantially free of side structure in positions which are laterally adjacent to the lug-engagement surfaces between adjacent pairs of the drive members and radially beyond the circumferential edge, whereby the track lugs are free to adjust their precise positions of engagement with the lug-engagement surfaces.